CLAIMS

We Claim:

1. A method of making a multilayer film, comprising the steps of:

(a) forming a core layer comprising a polypropylene film;

(b) monoaxially orienting the core layer in a first direction;

(c) providing at least one multilayer cap layer comprising:

(i) a non-crystallizable, amorphous polyester layer comprising a sufficient proportion of a non-crystallizable, amorphous polyester to render the amorphous polyester layer non-crystallizable;

(ii) a first tie layer interposed between the polyester layer and the core layer, the first tie layer comprising an adhesive; and,

(d) orienting the multilayer cap film in a second direction transverse to the first direction; and

(e) coating the at least one multilayer cap film to at least one side of the monoaxially oriented core layer to provide a biaxially-oriented multilayer film.

2. The method of claim 1, wherein the cap film further comprises a second tie layer interposed between the first tie layer and the core layer, the second tie layer comprising a polymer selected from the group consisting of a polypropylene copolymer, a terpolymer, and a linear ethylene polymer.

3. The method of claim 1, wherein the core layer further comprises a second tie layer interposed between the first tie layer and the core layer, the second tie layer comprising a

polymer selected from the group consisting of a polypropylene copolymer, a terpolymer, and a linear ethylene polymer.

4. The method of claim 1, further comprising the step of metallizing an outer surface of the biaxially-oriented multilayer film opposite the polyester layer.

5. The method of claim 1, wherein the non-crystallizable, amorphous polyester is a polyester selected from the group consisting of a glycolized polyethylene terephthalate, a cyclohexane dimethanol polyester soaked in diethylene glycol, and a mixture of a glycolized polyethylene terephthalate and a cyclohexane dimethanol polyester soaked in diethylene glycol.

6. The method of claim 1, wherein the polyester layer comprises at least about 50% by weight of a non-crystallizable, amorphous polyester, based on the total weight of the polyester layer.

7. The method of claim 1, wherein the polyester layer comprises at least about 70% by weight of a non-crystallizable, amorphous polyester, based on the total weight of the polyester layer.

8. The method of claim 1, wherein the polyester layer comprises at least about 90% by weight of a non-crystallizable, amorphous polyester, based on the total weight of the polyester layer.

9. The method of claim 1, wherein the polyester layer comprises at least about 95% by weight of a non-crystallizable, amorphous polyester, based on the total weight of the polyester layer.

10. The method of claim 1, wherein the polyester layer comprises at least about 99% by weight of a non-crystallizable, amorphous polyester, based on the total weight of the polyester layer.

11. The method of claim 1, wherein the core layer further comprises at least one incompatible inorganic mineral in an amount sufficient to render the core substantially opaque.

12. The method of claim 11, wherein the inorganic mineral is an inorganic mineral selected from the group consisting of titanium dioxide, aluminum oxide, zinc oxide, calcium sulfate, barium sulfate, calcium carbonate, magnesium carbonate, silica, sodium silicate, aluminum silicate, mica, clay, and talc.

13. The method of claim 11, wherein the inorganic mineral is an inorganic mineral selected from the group consisting of aluminum oxide, zinc oxide, calcium sulfate, barium sulfate, calcium carbonate, magnesium carbonate, silica, sodium silicate, aluminum silicate, mica, clay, and talc and is present in the core layer in a concentration in a range of about 2 wt.% to about 25 wt.%.

14. The method of claim 1, wherein the multilayer film contains at least one additive selected from the group consisting of antioxidants, lubricants, surfactants, antistats, slip agents, antiblock agents, nucleating agents, coupling agents, coated minerals, pigments, and dyes.

15. The method of claim 1, wherein the polypropylene film of the core layer is coextruded between two second tie layers.

16. The method of claim 15, wherein the polypropylene film of the core layer contains at least one incompatible inorganic mineral in an amount sufficient to render the core layer substantially opaque.

17. The method of claim 16, wherein at least one of the two second tie layers contains at least one incompatible inorganic mineral in an amount sufficient to enhance the opacity of the core layer.

18. The method of claim 17, wherein at least one of the two second tie layers contains titanium dioxide.

19. The method of claim 18, wherein the at least one of the two second tie layers that contains titanium dioxide also contains a cavitating mineral.

20. The method of claim 19, wherein the cavitating mineral is calcium carbonate.

21. The method of claim 15, wherein the polypropylene film is substantially free of incompatible inorganic minerals and at least one of the two second tie layers contains at least one incompatible inorganic material in an amount sufficient to render the core layer substantially opaque.

22. The method of claim 21, wherein at least one of the two second tie layers contains titanium dioxide.

23. The method of claim 22, wherein the second tie layer that contains titanium dioxide also contains a cavitating mineral.

24. The method of claim 23, wherein the cavitating mineral is calcium carbonate.

25. The method of claim 15, wherein at least one outer surface of the multilayer film is metallized.

26. The method of claim 1, wherein the first tie layer comprises an adhesive selected from the group consisting of copolymers of ethylene with at least one carboxylic acid or carboxylic acid anhydride and terpolymers of ethylene, an ester, and a carboxylic acid or carboxylic acid anhydride.

27. The method of claim 26, wherein the ester is selected from the group consisting of vinyl acetate, methyl acrylate, butyl acrylate, ethyl acrylate, and partially hydrolyzed ester derivatives.

28. The method of claim 26, wherein the carboxylic acid or carboxylic acid anhydride is selected from the group consisting of acrylic acid, methacrylic acid, maleic acid, and maleic anhydride.

29. The method of claim 28, wherein the first tie layer is an ethylene-acrylic acid copolymer.

30. The method of claim 26 wherein the terpolymer is an ethylene-ester copolymer modified with a carboxylic acid or carboxylic acid anhydride.

31. The method of claim 30, wherein the terpolymer is an ethylene-ester copolymer backbone grafted with a carboxylic acid or carboxylic acid anhydride.

32. The method of claim 26, wherein the adhesive is a terpolymer, wherein the ethylene, the ester, and the carboxylic acid or acid anhydride are incorporated in a main chain of the terpolymer.

33. The method of claim 1, wherein the cap film is free of a silicone fluid.

34. The method of claim 1, wherein the first tie layer comprises a polyolefin adhesive.

35. A multilayer film, comprising:

(a) a core layer comprising a polypropylene film monoaxially oriented in a first direction;

(c) at least one multilayer cap film comprising:

(i) a non-crystallizable, amorphous polyester layer comprising a sufficient proportion of a non-crystallizable, amorphous polyester to render said amorphous polyester layer non-crystallizable; and

(ii) a first tie layer interposed between said polyester layer and said core layer, said first tie layer comprising an adhesive; and,

(d) said multilayer cap film oriented in a second direction transverse to said first direction;

(e) said at least one multilayer cap film coated to at least one side of said monoaxially oriented core layer to provide a biaxially-oriented multilayer film.

36. A biaxially oriented multilayer film having a core layer comprising a polyolefin film, a non-crystallizable, amorphous polyester layer comprising a sufficient proportion of a non-crystallizable, amorphous polyester to render said amorphous polyester layer non-crystallizable, and at least one tie layer interposed between said core and polyester layers.